

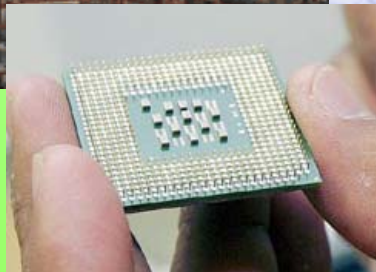
Application of



to Foster Enhanced Building Safety

Building and Fire Research Laboratory

Fire Research



Annual Fire Conference

Dave Conover
April 5, 2007

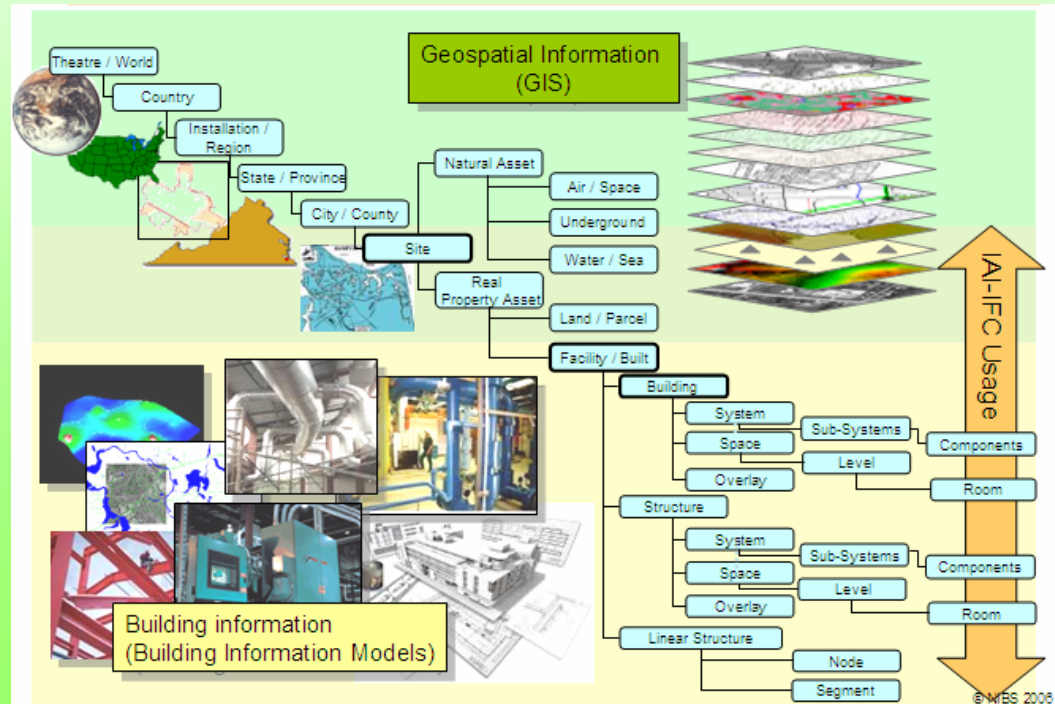


Vision

....the dynamic and seamless exchange, updating and maintenance of accurate, useful information on the built environment among all members of the building community throughout the lifecycle of a facility

....a smarter process for managing the lifecycle of a project to enhance public safety

....continual access to and sharing of information about a building



Interoperability

Rules and Regulations
Bldg, H&S, Planning



Knowledge databases
Company
External

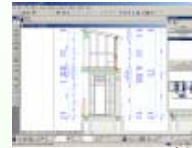


Functional description
Functions
Calculations
Requirements
Constraints

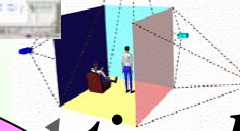
Communication of information between software applications and the ability for anyone to use and act on the information in a useful way

BIM

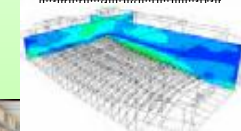
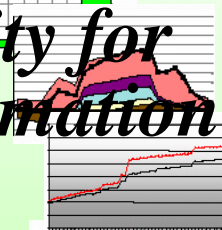
BIM software
Arch, Struct, Eng Services
Civ Eng



VRML
Visualisation
3D models



Simulation
Comfort
Air, heating
Lifecycle costs
Light and sound
Insulation
Use
Fire
Environmental impact
Life expectancy



Reuse
Refurbishment
Demolition
Reconstruction



FM
Renting, sale and use
Maintenance
Warranty



...the seamless and smarter sharing and exchanging of information via integrated technological solutions

4D
Schedules
Logistics



Sourcing
Product databases
Price databases



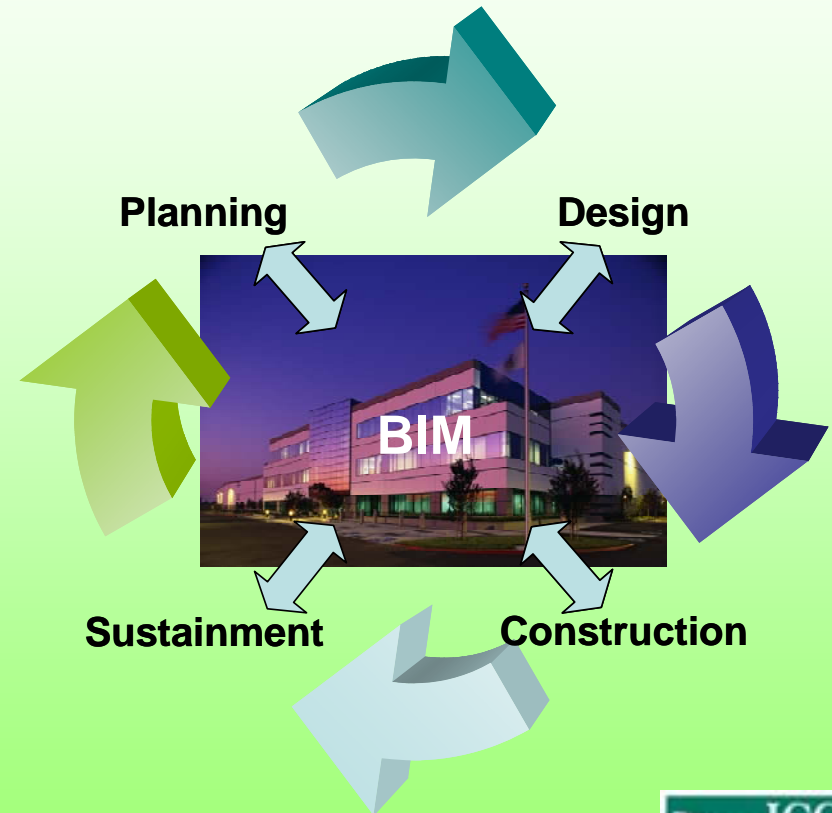
Description
Inc cost estimates



Building Information Model

A digital representation of physical and functional characteristics of a building (data)

- *... a shared knowledge source or database for intelligent information about a facility that can be maintained over time that*
- *... stays with the building forever*
- *... can be seamlessly used by all*
- *... must follow an established standard if BIMs are to contain needed information in a usable format*



National BIM Standard

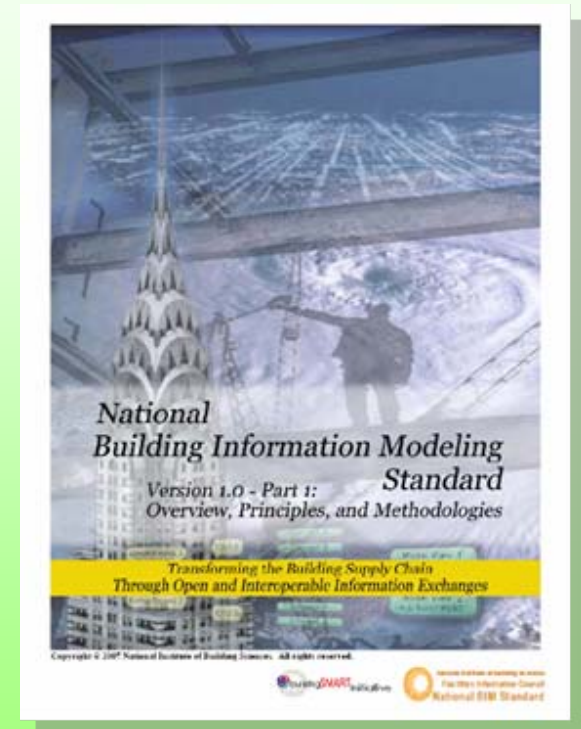


Vision

- *Improved planning, design, construction, operation, and maintenance processes*
- *Use of a standardized machine-readable information model for each facility*
- *Availability of all appropriate information about a facility in a format useable throughout its life-cycle*

Mission

- *Improve the performance of facilities over their full life-cycle*
- *Foster a common, standard and integrated life-cycle information model*
- *Free flow of graphic and non-graphic information among all parties*
- *Coordinate U.S. efforts with related activities taking place internationally*



buildingSMART

....BIM facilitated by an open standard covering information for construction (IFC)

....a way of doing planning, designing, reviewing, approving, costing, maintaining, etc. buildings better

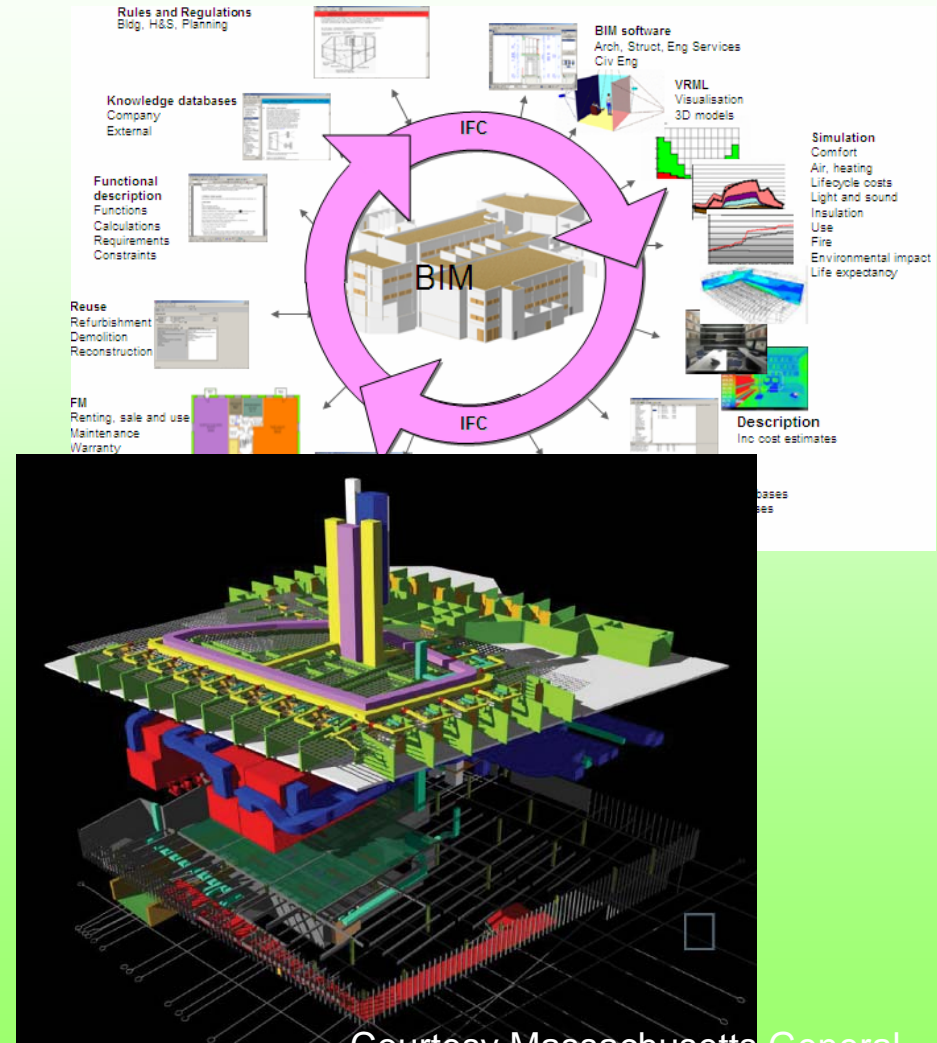
....the act of building (a verb) smart (the opposite of dumb)

.....a concept that is becoming reality as different building interests collaborate without self-interest for the common good



A Foundation to Achieve the Best

- **Communication and collaboration**
- **More robust and timely information**
- **Transparency**
- **More informed decisions**
- **Better buildings**
- **Reduced LCC**
- **Increased productivity**
- **Complete visualization anytime**



Courtesy Massachusetts General Hospital

Safety Related Use Cases

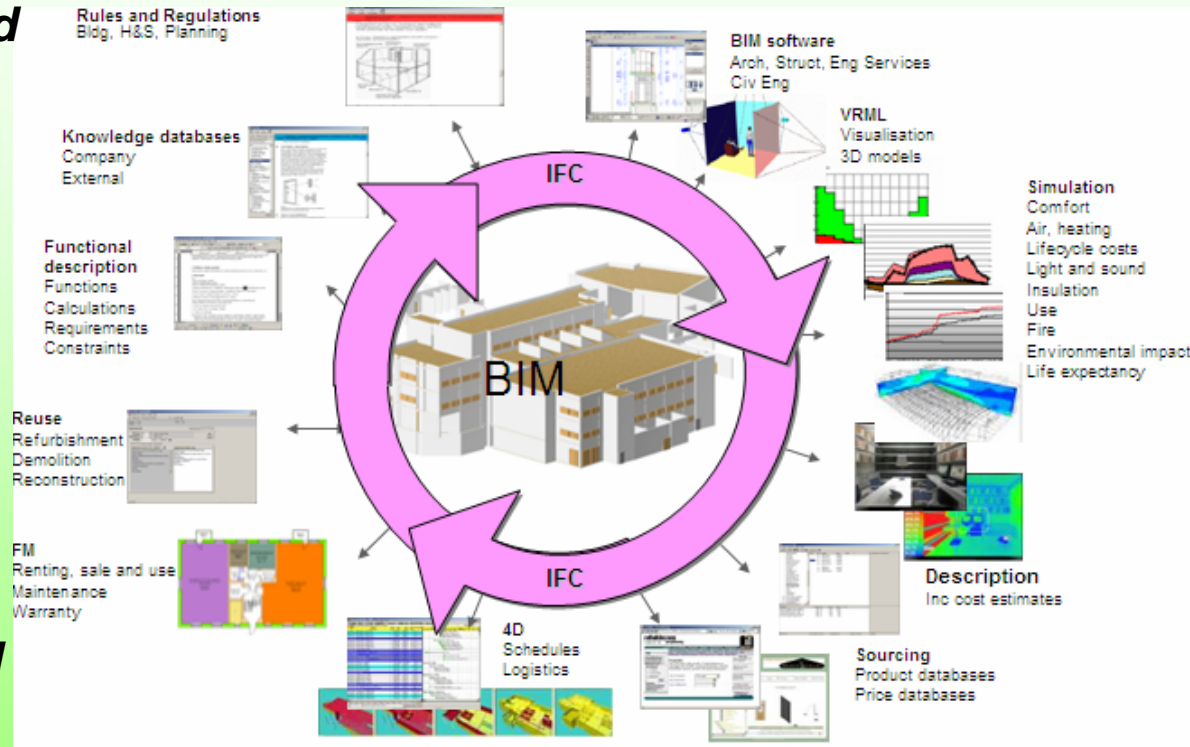
- **Design and construction compliance with codes and regulations**

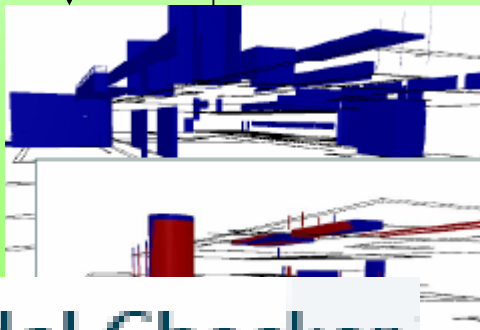
- **Performance modeling to validate compliance with codes and regulations**

- **Energy**
- **IAQ**
- **Fire and smoke**

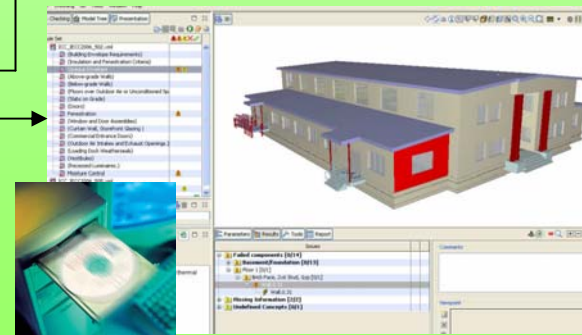
- **Availability of as built and maintained information**

- **Building forensics**
- **Fire fighting**
- **Energy control**





Model Checker



Design and Construction

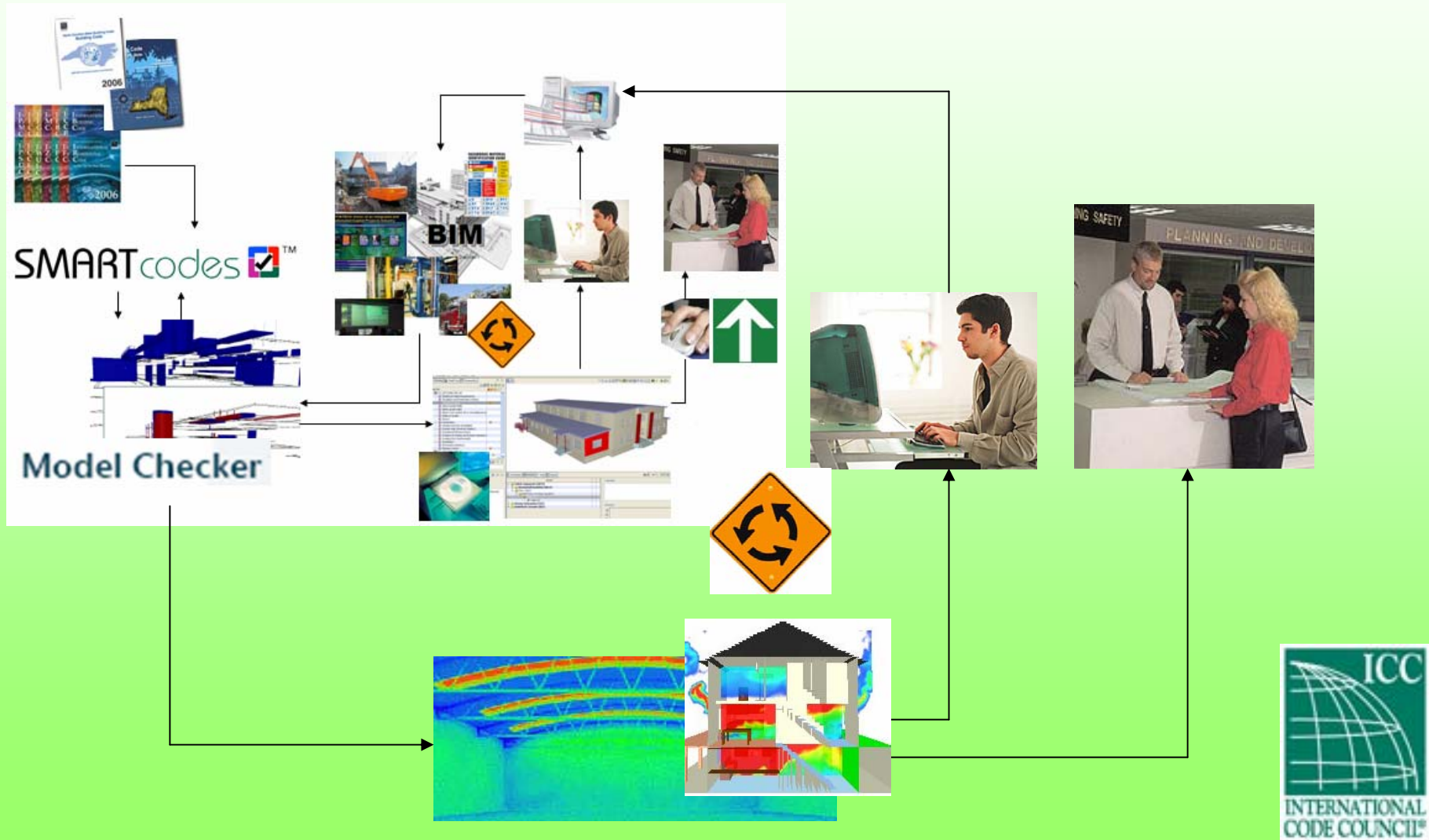
Safety Issues

The screenshot displays the SMC Building software interface, which is used for safety analysis in building design. The interface includes several panels:

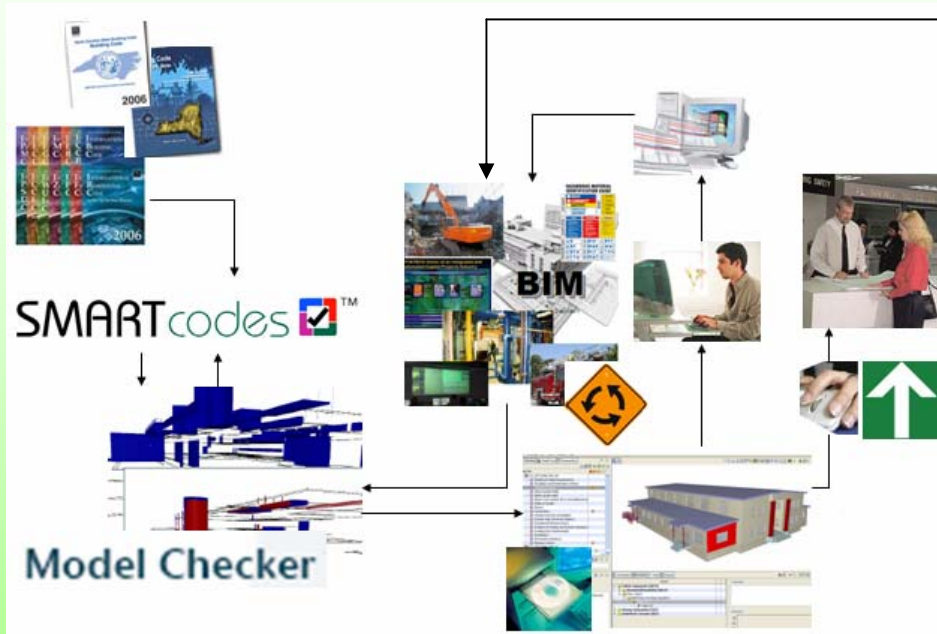
- Rule Set:** A list of safety rules being checked, such as "Fire Compartment Area Must Be within Limits", "Fire Walls Must Have Correct Wall, Door, and", "Spaces Must Be Included in Fire Compartment", "Door Minimum Dimensions", "Doors and Windows Must Be Connected to Spa", and "Escape Route Analysis".
- Model Tree:** A hierarchical view of the building model, showing the structure from "SMC Building" down to "Building.b1.1", "Ground floor", "First floor", "Second floor", and various components like "Column", "Door", "Fire Compartment", "Opening", "Slab", "Stair", "Wall", and "Window".
- Selection Basket:** A list of selected elements, currently showing "Wall".
- Info Panel:** Provides details about the selected element, including its "Component" (e.g., "External Walls", "Gross Areas", "Fire Compartments", "Secure Compartments") and "Description".
- 3D Model:** A 3D visualization of the building model, showing fire compartments (colored red) and escape routes (colored blue). The model is labeled with "2" in a central area.
- Parameters, Results, Tools, Report:** A set of tabs for managing the analysis, with "Results" currently selected.
- Visualization:** A section for configuring the 3D view, including checkboxes for "Show Routes", "Show Fire Compartments", "Show Occupancies", and "Show Exits".
- Space List:** A list of spaces within the building, including "Space.1.1 : Office[202]", "Space.1.10 : Office[209]", "Space.1.11 : Corridor[201]", "Space.1.12 : Stair[214]", "Space.1.13 : Restroom[204]", "Space.1.14 : Office[210]", "Space.1.15 : Office[203]", "Space.1.16 : Corridor[241]", "Space.1.2 : Office[212]", and "Space.1.5 : Office[211]".

The interface also includes a "Support Tag" section and a "Rule Help" link.

Performance Modeling



As Built and Maintained



Summary

Interoperability = basis for communication of data

building SMART = application and use of data

BIM = dynamic data resource

Interoperability + buildingSMART + BIM = 

Questions

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